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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/628,492

07/29/2003

Masanobu Ando

T36-157944M/KOH

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03/24/2006

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EXAMINER

MULPURI, SAVITRI

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/628,492	<b>Applicant(s)</b> ANDO, MASANOBU	
	<b>Examiner</b> Savitri Mulpuri	<b>Art Unit</b> 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 12-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/29/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This action is in response to the applicant's communication, amending the claims, filed on 1/5/2005.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 6, 14, 18-19, 24 are rejected under 35 U.S.C. 102(b) as being anticipated by IBM Technical Disclosure Bulletin (TDB-ACC-NO: NN75101486, VOL 18, Issue 5)

IBM publication teaches growing sapphire on silicon, wherein silicon layer has cavities (Fig. 2B); growing sapphire in the cavities of silicon substrate (see Fig. 2C); separating the grown sapphire from the silicon substrate by contacting with copper plate or by evaporation (see fig. 2D and see the abstract). With respect to claim 14, IBM publication teaches growing sapphire by epitaxy. IBM publication also discloses broadly forming sapphire styli array, which inherently means periodically two-dimensional as in claim 6, uniformly spaced as in claim 18, and as an array as claimed in claim 19.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2812

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 15, 16, 17, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (TDB-ACC-NO: NN75101486, VOL 18, Issue 5).

IBM publication teaches producing sapphire with pyramid structure because the mold shape provided in silicon substrate but does not teach convex or substantially spherical shape. However, with respect to claims 5, 16, 17, the choice of selecting the mold in silicon substrate would have been well within the choice of one of ordinary skill in the art depending upon the desired final shape in the sapphire, where final shape is the reverse of the mold or cavity. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example,

Art Unit: 2812

In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

In IBM publication, It is not clear whether the growth temperature is 300 C or not. Generally, the difference in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. So it would have been obvious to one having ordinary skill in the art at the time the invention was made to grow sapphire at temperature of 300 C since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claim 4,15 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBMTDB in combination with Fujitsu LTD (JP53016396A).

Fujitsu publication teaches a method of growing sapphire on silicon substrate at a temperature of 600 °C; heat treating the grown sapphire at a temperature 1270 °C to form alpha sapphire (alumina) layer. It would have been obvious to one of the ordinary skill in the art to heat treat to form alpha sapphire for the benefit of producing sapphire with good quality.

Claim 3, 12, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBMTDB publication in combination with Kawama et al (US 5,665,607).

IBMTDB publication does not teach etching the sapphire substrate. Kawama teaches growing a semiconductor layer "3" on the sapphire substrate before etching silicon "3" to separated from sapphire "1" using HF (see fig. 13 b col.23, left col, lines 27-40). It would have been obvious to use etching in the invention of IBM publication to remove silicon material from sapphire by etching as suggested by Kawama et al.

Claims 7-9, 13, 20-24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBMTDB publication in combination with Kamimura (2000-036619). IBM publication teaches growing sapphire on silicon, wherein silicon layer has cavities (Fig. 2B); growing sapphire in the cavities of silicon substrate (see Fig. 2C); separating the grown sapphire styli array from the silicon substrate by contacting with copper plate or by evaporation (see fig. 2D and see the abstract).

IBM publication does not teach growing GaN based layers and electrode. Kamimura teaches GaN based layer and electrode over sapphire. It would have been obvious to use sapphire produced by the process of IBM publication to grow GaN based layers and electrode to form light emitting device because Kimura teaches growing GaN based layers "102-104" and electrode "140" on sapphire substrate "101" to form light emitting device.

Note that the claims 7-9, 13, 20 are not limited to particular sequential process, for example., whether GaN based layer is formed before or after removal sapphire from seed substrate,.

Applicant's arguments filed on 12//28/2005 have been fully considered but they are not persuasive. Applicant repeatedly argues that claimed limitation of "irregularities include cavities formed periodically in the sapphire growth surface of the seed substrate during molding a seed substrate", where as IBM publication teaches single cavity and would not teach or suggest cavities. However, IBM publication teaches forming plural windows in silicon oxide by photolithography and then anisotropic etching the silicon substrate to form plural cavities and then growing sapphire and removing the silicon substrate to form sapphire sapphire styli array, which inherently means periodically two-dimensional as in claim 6, uniformly spaced as in claim 18, and as an array as claimed in claim 19. In IBM publication the nature of the photolithography technique results pattern, which is periodic cavities. Applicant must read the whole abstract, which clearly mention windows to form cavities.

Applicant argues that there is no motivation to heat treat the grown sapphire to form alpha sapphire. Fujitsu teaches heat treating to form sapphire layer for the benefit of producing uniform single crystalline quality sapphire film. Applicant argues that Fujitsu does not teach "irregularities include cavities formed periodically in the sapphire growth surface of the seed substrate during molding a seed substrate". Note that Fujitsu is only relied to support heat treatment step the sapphire 1270 C to form alpha sapphire.

Applicant argues that Kawama does not teach "irregularities include cavities formed periodically in the sapphire growth surface of the seed substrate during molding a seed substrate". However, Kawama is relied on to grow semiconductor layer "3" on the sapphire substrate before etching silicon "3" to separated from sapphire "1" using HF (see fig. 13 b col.23, left col, lines 27-40).

Applicant argues that that there is no motivation to combine IBM publication with the teaching of Kamimuara. Kamimuara is relied to form GaN based layers on

Art Unit: 2812

sapphire to form light emitting device. The sapphire resulted in IBM publication is used to form GaN based layers as suggested by kamimuara.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Savitri Mulpuri whose telephone number is 571-272-1677. The examiner can normally be reached on Mon-Fri from 8 a.m. to 4.30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt, can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Savitri Mulpuri  
Primary Examiner  
Art Unit 2812